TYAN

Toledo q35T /// S5220

Version 1.1

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	1 x S5220 user's manual
	1 x S5220 Quick Reference guide
	1 x TYAN driver CD
	1 x I/O shield

If any of these items are missing, please contact your vendor/dealer for replacement before continuing with the installation process.

NOTE

Chapter 1: Introduction

1.1 - Congratulations

You have purchased one of the most powerful server solutions available. The Toledo q35T (S5220) is a flexible Intel® platform for multiple applications, based on the Intel® Q35 memory Controller Hub (GMCH) and 82801IR I/O Controller Hub (ICH9R) chipsets.

Designed to support the family of Intel® Socket 775 processors and 8GB of DDR2 800/667 memory, the S5220 has integrated Dual Ethernet LAN's, an integrated graphics controller from Q35 and six SATA-II ports. This motherboard represents the best choice for a server platform product.

Remember to visit TYAN's Website at http://www.TYAN.com. There you can find information on all of TYAN's products with FAQs, online manuals and BIOS upgrades.

1.2 - Hardware Specifications

Processor
- One (1) LGA775-pin socket supports Intel CPUs of the type below:
  - Intel Core 2 Duo / Wolfdale / Yorksfield Quad core processors
- Supports 1333/1066/800 MT/s FSB

Expansion Slots
- One (1) PCI-E x16 slot
  - with Tyan M2061 riser card: PCI-E x8 to PCI-X
  - with Tyan M2083-RS riser card: PCI-E x16 to PCI-E x16
- One (1) PCI-X x8 slot with PCI-E x4 link only
- Four (4) PCI slots

Chipset
- Intel® Q35 Memory Controller Hub (GMCH)
- Intel 82801IR I/O Controller Hub (ICH9R)
- Winbond W83627DHG super I/O

Onboard Audio
- Onboard Realtek ALC262

Integrated LAN Controllers
- One (1) Intel 82573L and one (1) Intel 82573V single port Gigabit Controller

Integrated SATA Controllers
- Six (6) SATA ports from ICH9R

Integrated I/O
- One (1) 40-pin IDE connector (Extend IDE from ITE IT8213F)
- Six (6) SATA (3Gb/s) ports
- Four (4) USB 2.0 connectors (support two USB 2.0 devices)
- One (1) shrouded header for serial port or LCM module interface connector
- One (1) pin header for audio ports
- One (1) TYAN SMDC connector for server management (M3295-2)
- One (1) pin header for SMBUS connection
- One (1) 34-pin FDD connector

Integrated 2D/3D PCI Graphics
- Integrated graphics from Q35; one PCI-E x16 slot is available for the VGA card

Memory
- Four 240-pin DDR2 sockets support up to 8 GB
- Dual channel memory bus (must be populated in pairs)
- Un-buffered, non-ECC DDR2 667/800 MHz DIMM
- Supports 256MB, 512MB, 1GB, 2GB DIMM

System Management
- Total six (6) fan headers with control and tachometer monitoring
- Monitoring voltage for CPU, Memory & Power Supply
- Monitoring temperature for CPU & environment
- One (1) pin header for Chassis Intrusion detection
- Supports Serial Console Redirect
- Supports Watch Dog Timer, ACPI S1/S3/S4/S5

External I/O Ports
- Stacked PS/2 mouse & keyboard ports
- Stacked two (2) USB ports
- Stacked COM port and VGA port
- Stacked two (2) USB ports and one (1) 10/100M LAN port (LAN port is for M3295-2 only)
- Two (2) RJ-45 10/100/1000M ports
- Audio connectors (Line-in/Line-out/Mic-in)

BIOS
- Phoenix BIOS on 8Mbit LPC Flash ROM
- Supports boot from USB device
- Supports ACPI 2.0
- Power-on mode control for AC power loss recovery

Power Supply
- EPS 12V Power Supply (24-pin + 8-pin power connectors)

Regulatory
- FCC Class B (DoC)
- European Community CE (DoC)

Form Factor
- ATX form factor
- 12" x 9.6" (305mm x244mm)

Chapter 2: Board Installation

You are now ready to install your motherboard. The mounting hole pattern of the Toledo q35T (S5220) matches the ATX specification. Before continuing with installation, confirm that your chassis supports an ATX motherboard.

How to install our products right… the first time

The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap.
(2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
(3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
(4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
(5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

NOTE	DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.

2.1- Board Image
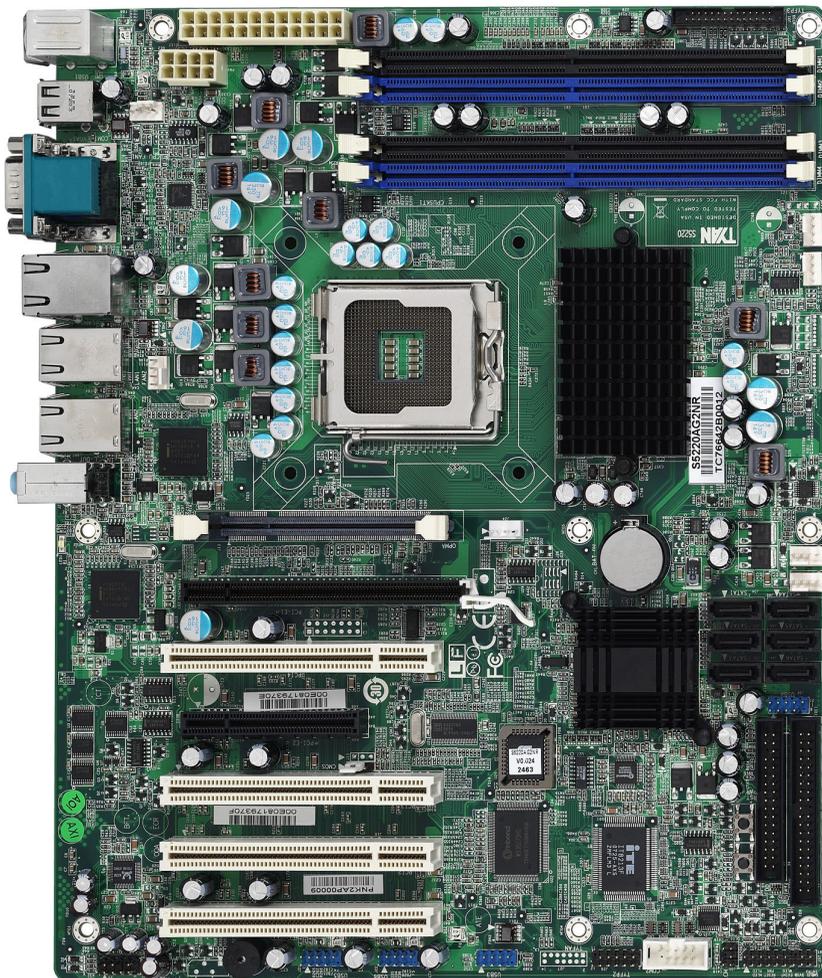
Toledo q35T S5220

This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

2.2 - Block Diagram
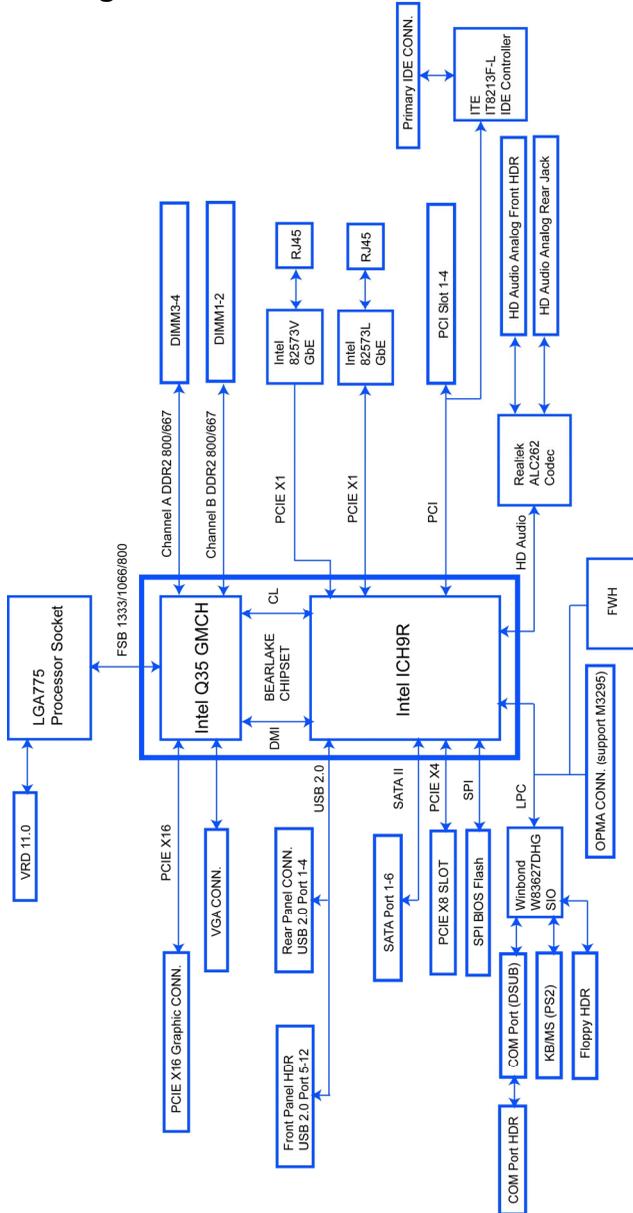
Toledo q35T S5220

2.3 - Board Parts, Jumpers and Connectors
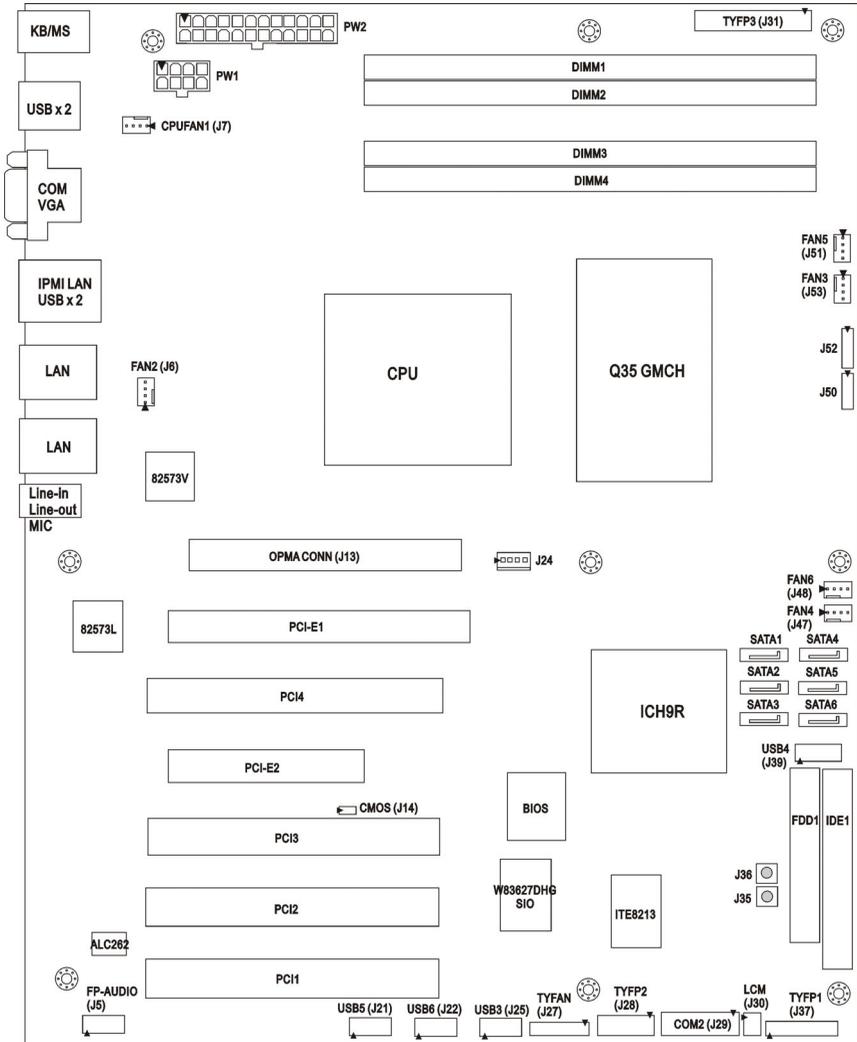
This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

Jumper Legend

▢▣	**OPEN** - Jumper OFF, without jumper cover
▣▣	**CLOSED** – Jumper ON, with jumper cover

Jumper/Connector	Function
COM2	COM2 Header
CPUFAN1, FAN2/3/4/5/6	4-pin Fan Connector with Tachometer
USB3/USB4/USB5/USB6	USB Front Panel Connector
TYFP1	Front Panel Connector
TYFP2/TYFP3	Front Panel Connector for Barebone
LCM	LCM Connector for Barebone
J13	OPMA Connector (supports TYAN M3295)
J24	Aux. Power Connector for TYAN Riser Card (M2061)
FP-AUDIO	Front Panel Audio Connector
J35	Reset Switch
J36	Power Switch
TYFAN/J50/J52	Fan Connector for Barebone
CMOS (J14)	Clear CMOS Jumper Pin 1-2 closed: Normal (Default) Pin 2-3 closed: Clear

CPUFAN1

FAN5

FAN2

FAN3

J24

FAN6

FAN4

TYFP1

LCM
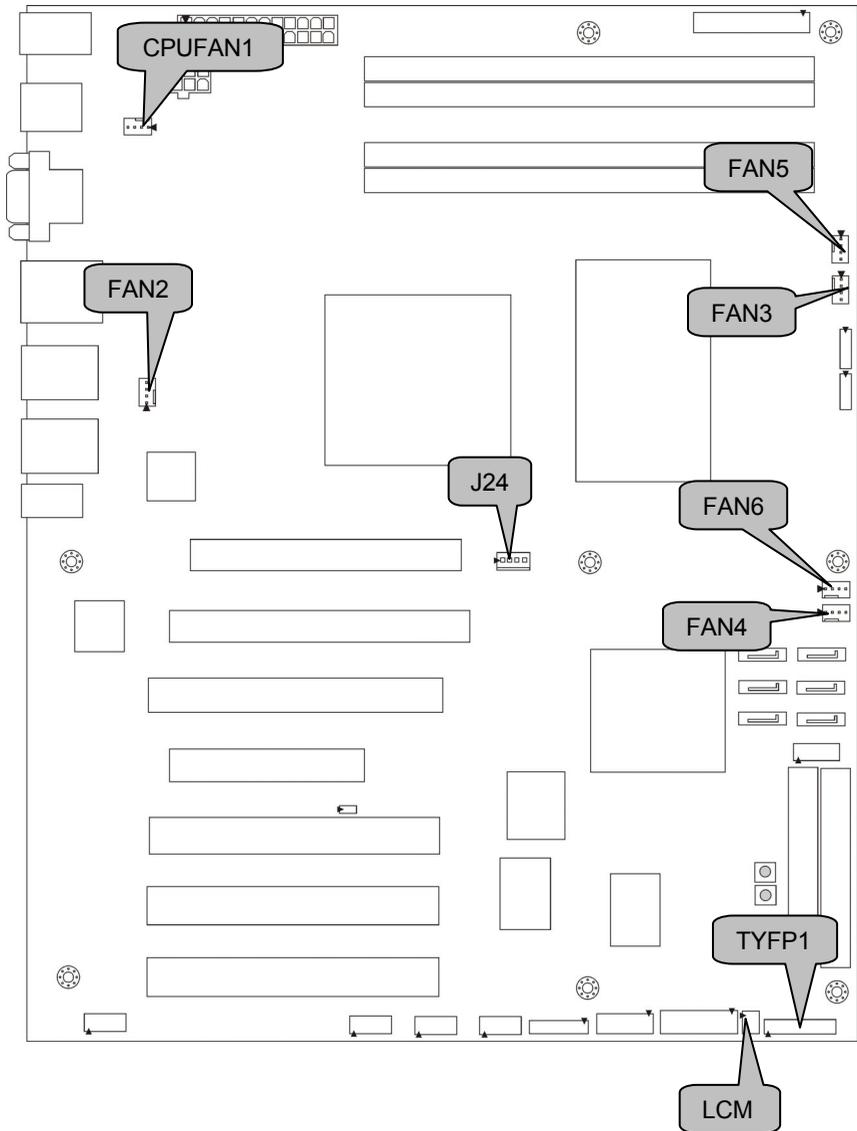
CPUFAN1/FAN2~FAN6: 4-pin Fan Connector with Tachometer

GND
+12V
Tachometer
PWMControl

1
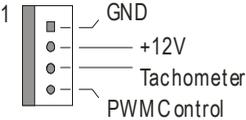
Use these headers to connect the 4-pin cooling fans to your motherboard to keep the system stable and reliable.

CPUFAN1: J7	FAN2: J6
FAN3: J53	FAN4: J47
FAN5: J51	FAN6: J48

These connectors support the tachometer monitoring and auto fan speed control.

J24: Aux. Power Connector for TYAN Riser Card (M2061)

1
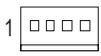
Pin	Signal	Pin	Signal
1	+12V	2	GND
3	GND	4	+5V

LCM (J30): LCM Header for Barebone

1 ■ ■ 2
■
5 ■ ■ 6

It is designed for barebone use only.

Pin	Signal	Pin	Signal
1	+5V	2	RXD (Receive Data)
3	Key Pin	4	GND
5	+5V Standby	6	TXD (Transmit Data)

TYFP1 (J37): Front Panel Header

The Front Panel Header is used to connect some control or signal wires from motherboard to chassis, such as HDD LED, power LED, power button, and reset button.

Intrusion -	18	17	SMBUS Clock
GND	16	15	SMBUS Data
Key Pin	14	13	+5V Standby
Warning LED -	12	11	Ext. Interrupt (NMI)
Warning LED+	10	9	+5V
GND	8	7	Reset -
PWR_SW -	6	5	GND
PWR LED-	4	3	HDD LED-
PWR LED+	2	1	HDD LED+

SATA1 SATA4
SATA2 SATA5
SATA3 SATA6

USB4

FP-AUDIO

USB6

COM2

USB5

USB3

USB3/USB4/USB5/USB6: USB Front Panel Connector

```
2        10
■ ■ ■ ■ ■
■ ■ ■ ■
1         9
```
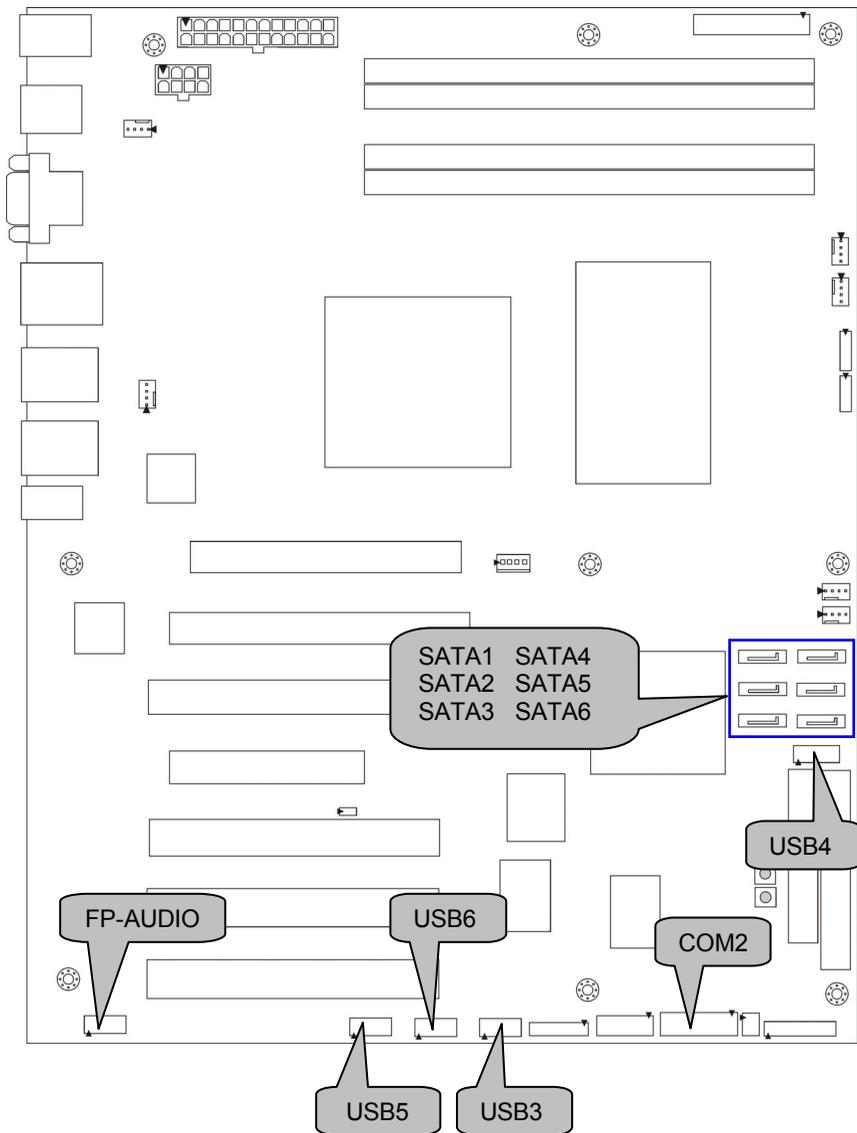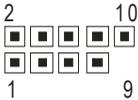
Pin	Signal	Pin	Signal
1	+5V Standby	2	+5V Standby
3	USB_A-	4	USB_B-
5	USB_A+	6	USB_B+
7	GND	8	GND
9	Key Pin	10	GND

USB3: J25	USB5: J21
USB4: J39	USB6: J22

Use these headers to connect to the USB devices via the enclosed USB cable.

COM2 (J29): COM2 Header
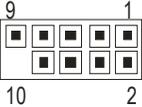
Use these pin definitions to connect a port to COM2.
*TYAN does not provide cable for this header. It is designed for barebone use only.

```
9        1
■ ■ ■ ■
■ ■ ■ ■
10       2
```

Pin	Signal	Pin	Signal
1	DCD (Data Carrier Detect)	2	DSR (Data Set Ready)
3	RXD (Receive Data)	4	RTS (Request To Send)
5	TX (Transmit Data)	6	CTS (Clear To Send)
7	DTR (Data Terminal Ready)	8	RI (Ring Indicator)
9	GND	10	NC

SATA1/2/3/4/5/6: Serial ATA Connector
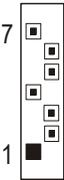
Connects to the Serial ATA ready drives via the Serial ATA cable.

```
7 ■
  ■
  ■
  ■
  ■
1 ■
```

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
GND	TXP	TXN	GND	RXN	RXP	GND

SATA1: J34	SATA4: J46
SATA2: J33	SATA5: J45
SATA3: J32	SATA6: J44

FP-AUDIO (J5): Front Panel Audio Connector

```
2        10
■ ■ ■    ■
■ ■ ■ ■ ■
1         9
```
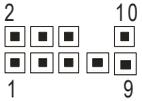
Pin	Signal	Pin	Signal
1	Microphone In-L	2	GND
3	Microphone In-R	4	Presence-
5	Headphone-R	6	Microphone Sense Return
7	Sense Send	8	Key Pin
9	Headphone-L	10	Headphone Sense Return

TYFP3

J52

J50

TYFAN
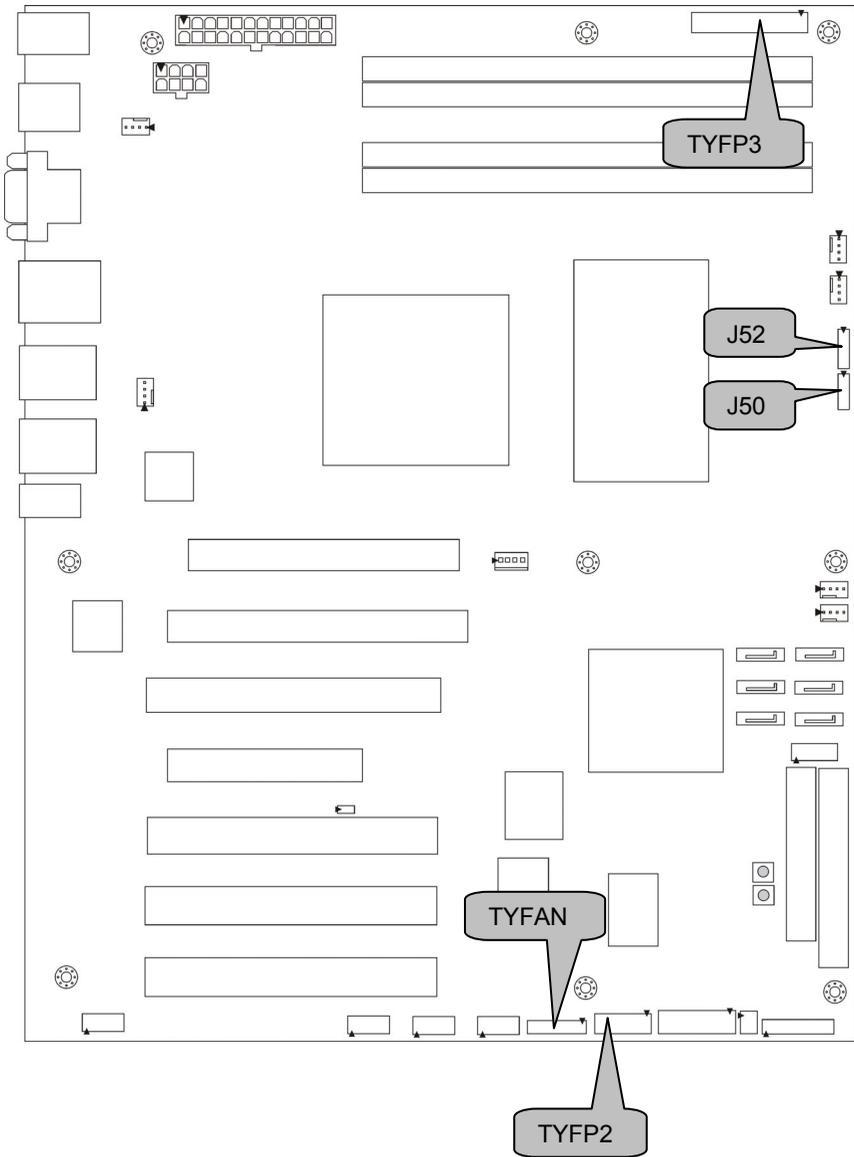
TYFP2

TYFP2 (J28) : Front Panel Connector for Barebone

It is designed for barebone use only.
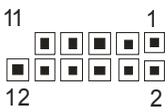
Pin	Signal	Pin	Signal
1	LAN1 LED+	2	LAN1 LED-
3	LAN2 LED+	4	LAN2 LED-
5	NC	6	NC
7	ID LED+	8	ID LED-
9	ID SW+	10	ID SW-
11	Key Pin	12	NC

TYFP3 (J31) : Front Panel Connector for Barebone

It is designed for barebone use only.
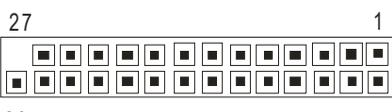
Pin	Signal	Pin	Signal
1	HDD LED+	2	HDD LED-
3	GND	4	RESET-
5	Power LED+	6	Power LED-
7	Warning LED+	8	Warning LED-
9	SMBus Data	10	SMBus Clock
11	Ext. Interrupt (NMI)	12	+5V
13	+5V Standby	14	Intrusion-
15	GND	16	PWR_SW-
17	LAN1 LED+	18	LAN1 LED-
19	LAN2 LED+	20	LAN2 LED-
21	NC	22	NC
23	ID LED+	24	ID LED-
25	ID SW+	26	ID SW-
27	Key Pin	28	NC

J50/J52/TYFAN (J27): Fan Connector for Barebone

It is designed for barebone use only.
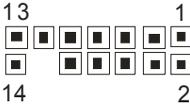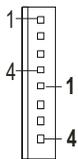
Pin	Signal	Pin	Signal
1	Tachometer 1	2	Tachometer 6
3	Tachometer 2	4	NC
5	Tachometer 3	6	NC
7	Tachometer 4	8	NC
9	Tachometer 5	10	NC
11	GND	12	Key Pin
13	GND	14	PWM Control

Pin	Signal	Pin	Signal
1	PWM Control 1	2	+12V1
3	Tachometer 1	4	GND
1	GND	2	Tachometer 2
3	+12V2	4	PWM Control 2

CMOS

CMOS (J14): Clear CMOS Jumper

	Use this jumper when you have forgotten your system/setup password or need to clear the system BIOS settings.
1 3 ▣▣▣ **Normal (Default)**	How to clear the CMOS data: - Power off system and **disconnect the power supply from the AC source** - Use jumper cap to close Pin 2 and 3 for several seconds to Clear CMOS
1 3 ▣▣▣ **Clear**	- Replace jumper cap to close Pin 1 and 2 Reconnect the power supply to the AC source - Power on system

2.4 - Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard
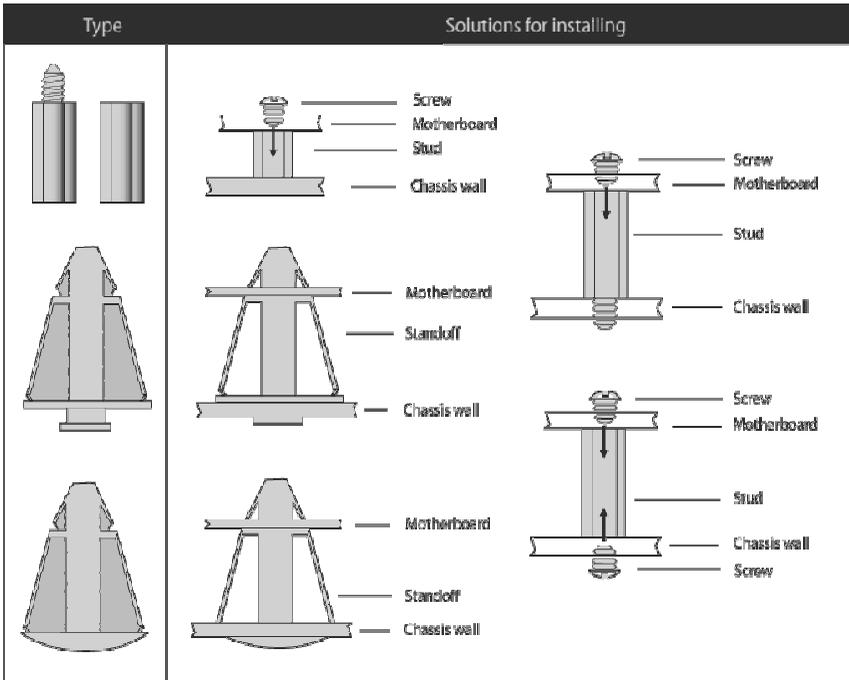
2.5 - Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Only DDRII-800/667 DIMM modules are required. Check the TYAN Web site at: **www.tyan.com** for details of the type of memory recommended for your motherboard.

The following diagram shows common types of DDRII memory modules.
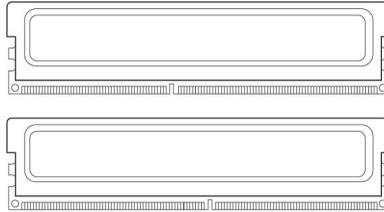
Key points to note before installing memory:

For optimal dual-channel DDRII operation, always install memory in pairs beginning with DIMM1 and DIMM3. Memory modules of the **same type and density** are required for dual-channel DDRII operation. Mismatched memory may cause system instability.

- Only **DDRII 800/667 un-buffered, non-ECC** memory modules are supported.
- All installed memory will automatically be detected and no jumpers or settings need changing.

Refer to the following table for supported DDRII populations.
(Note: V indicates a populated DIMM slot)

S5220 Recommended Memory Population

Location / Mode	DIMM1	DIMM2	DIMM3	DIMM4
Single Channel	V			
Single Channel			V	
Single Channel	V	V		
Single Channel			V	V
Dual Channel	V		V	
Dual Channel	V	V	V	V

Memory Installation Procedure

Follow these instructions to install memory modules into the S5220.

1.   Press the locking levers in the direction shown in the following illustration.
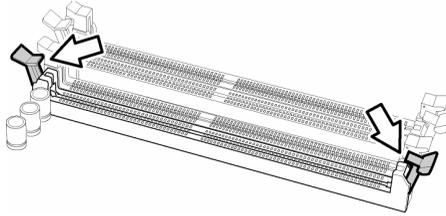
2.   Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.

Key slot
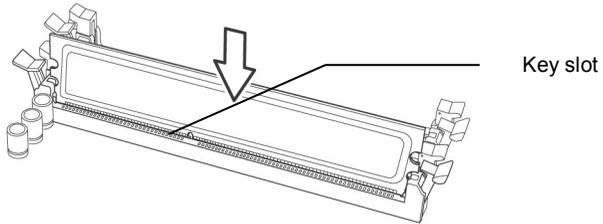
3.   Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.
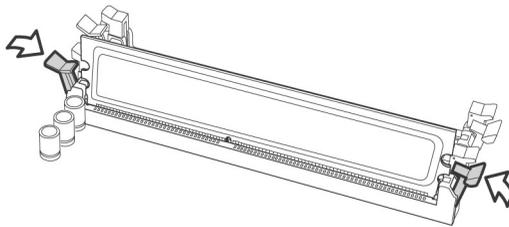
2.6 - Installing the Processor and Cooling Fan

Your S5220 supports the latest processor technologies from Intel. Check the TYAN website for latest processor support: http://www.tyan.com

Processor Installation (LGA 775 Socket)

The processor should be installed carefully. Make sure you are wearing an antistatic strap and handle the processor as little as possible.
Follow these instructions to install your processor and heat sink.

1.   Locate the processor socket on the motherboard and lift the locking lever to a fully open position.
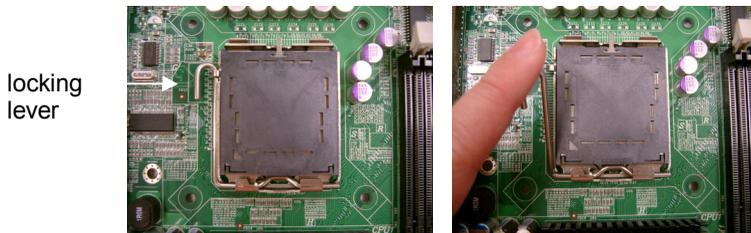
locking
lever

2.   Lift the load plate to a fully open position.
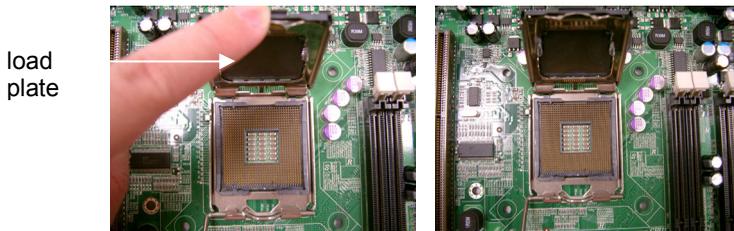
load
plate

3.   Insert the processor into the socket and make sure that pin 1 is correctly located.

Pin 1
identifier

4.   Remove the PnP cap from the load plate.

PnP cap

5.   Replace the load plate and return the locking lever to the locking position.
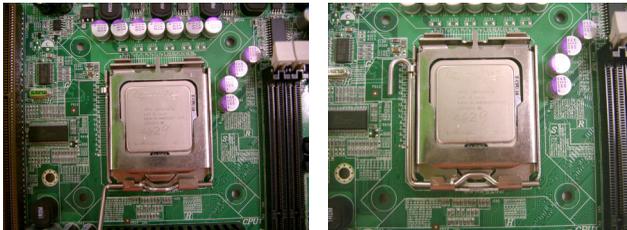
6.   The CPU installation is now complete.

Cooling Fan Installation
After you have installed the processor, the heatsink should be installed to ensure that the processor runs efficiently and does not overheat. Use the heatsink supplied for best results.

Follow these instructions to install the heatsink shown.
1.   Take out the heatsink from the package. Turn the heatsink upside down and you can see that the heatsink has already applied a layer of thermal compound.
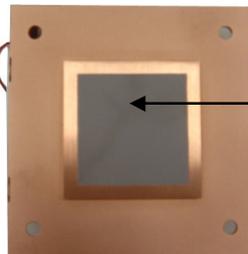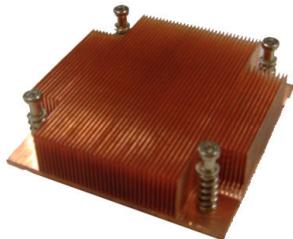
thermal compound

2.   Turn the board upside down and insert the heat sink spring mechanism as shown.

3.   Align the heatsink with the four holes around the processor socket.

4.   Press the heatsink down until the four screws are securely seated in the holes.

5.   Use screw drive to secure the four screws.

2.7 - Attaching Drive Cables

Attaching IDE Drive Cable

Attaching the IDE drive cable is simple. These cables are "keyed" to only allow them to be connected in the correct manner. TYAN motherboards have two on-board IDE channels, each supporting two drives. **The black connector designates the Primary channel, while the white connector designates the Secondary channel.**

Attaching IDE cables to the IDE connectors is illustrated below:
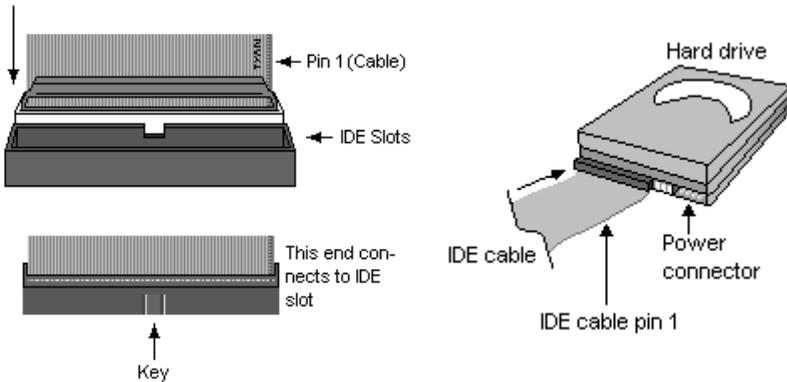
Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end(s) into the drive(s). Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard. The other two connectors are used to connect to drives.

Note: Always remember to properly set the drive jumpers. If only using one device on a channel, it must be set as Master for the BIOS to detect it.

TIP: Pin 1 on the IDE cable (usually designated by a colored wire) faces the drive's power connector.

Attaching Serial ATA Cables
The Toledo q35T (S5220) is also equipped with 6 Serial ATA (SATA) channels. Connections for these drives are also very simple.

There is no need to set Master/Slave jumpers on SATA drives.

The following pictures illustrate how to connect an SATA drive

1. **SATA drive cable connection**

2. **SATA drive power connection**

3. **SATA cable motherboard connector**

4. **SATA drive power adapter**
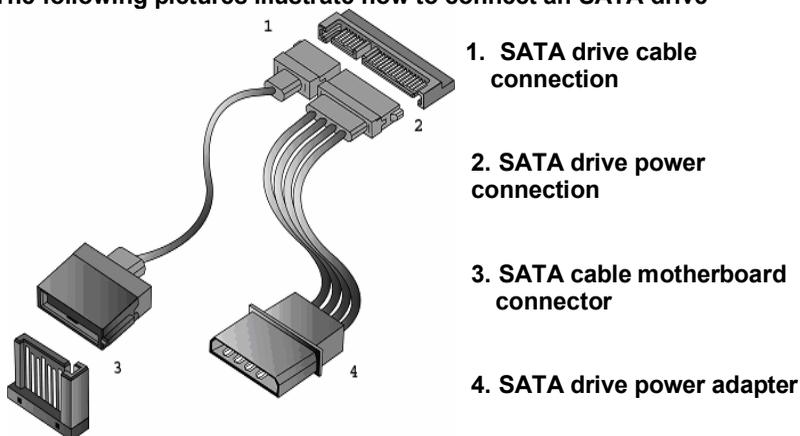
2.8 - Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that appear on your motherboard.

PCI-E x16 slot

PCI-E x8 slot

32/33 PCI 2.3 slot
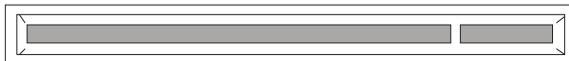
Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

NOTE	**YOU MUST ALWAYS** unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

2.9 - Installing Optional SO-DIMM modules

Your S5220 motherboard is equipped with an optional proprietary SO-DIMM connector. The 200-pin vertical SO-DIMM connector can be used for **TYAN M3295** expansion card to provide such features as additional TYAN SMDC modules support. For details of available expansions cards, visit the TYAN website at http://www.tyan.com. To install a SO-DIMM expansion card:

1. Open the spring levers as shown.
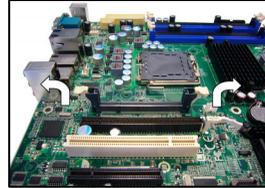
2. Insert the SO-DIMM card as shown, making sure that the card is the right way up. The card will fit in only one way and the screw holes in the card should line up exactly with the mounting posts on the motherboard.
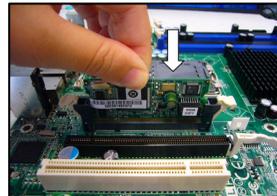
3. Push the SO-DIMM card down into place and make sure the spring levers click into place as shown.

    NOTE: The SO-DIMM expansion cards will fit in the slot only one way. Make sure that you align the slot in the card with the key in the card slot.
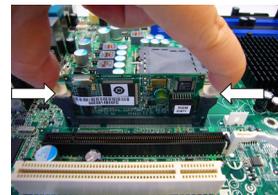
4. Removal of a SO-DIMM card is a reversal of the installation procedure. Push out the spring levers as shown and pull the card out of the socket.

2.10 - Connecting External Devices

The following diagram will detail the rear port stack for this S5220 motherboard:

Mouse Keyboard   **USBx2**   **Serial Port VGA Port**   **IPMI LAN USB x 2**   **Gigabit Ethernet x 2**   **Line-In Line-Out MIC**
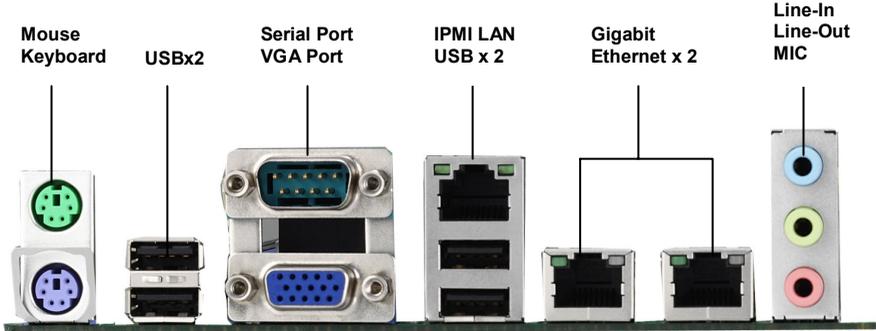
NOTE: Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

Onboard LAN LED Color Definition

The two onboard Ethernet ports have green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

10/100/1000 Mbps LAN Link/Activity LED Scheme		
LEFT RIGHT	Left LED (Link / Activity)	Right LED (Speed Status)
10 Mbps		Off
100 Mbps	Green / Blinking Green	Green
1000 Mbps		Yellow
No Link	Off	Off

2.11 - Installing the Power Supply

There are two power connectors on your mainboard. The board requires that you use an EPS12V power supply that has a 24-pin and an 8-pin power connector. Please be aware that ATX 2.x, ATX12V and ATXGES power supplies are **not** compatible with the motherboard and can damage.
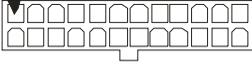
EPS12V (24-pin)   EPS12V (8-pin)

Applying power to the board

1. Connect the EPS 12V 8-pin power connector.
2. Connect the EPS 12V 24-pin power connector.
3. Connect power cable to power supply and power outlet

NOTE	**YOU MUST** unplug the power supply before plugging the power cables to motherboard connectors.

2.12 - Finishing Up

Congratulations on making it this far! You're finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**

Chapter 3: BIOS Setup

3.1 About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. This chapter describes different settings for the BIOS that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information when the power is turned off.

This motherboard's BIOS is a customized version of the industry-standard BIOS for IBM PC AT-compatible personal computers. The BIOS provides critical, low-level support for the system's central processing unit (CPU), memory, and I/O subsystems.

This BIOS has been customized by adding important features such as virus and password protection, power management, and chipset "tuning" features that control the system. This section will guide you through the process of configuring the BIOS for your system setup.

Starting Setup

The BIOS is immediately activated when you turn on the computer. The BIOS reads system configuration in CMOS RAM and begins the process of checking out the system and configuring it through the Power-On-Self-Test (POST).

When these preliminary tests are complete, the BIOS searches for an operating system on one of the system's data storage devices (hard drive, CD-ROM, etc). If one is found, the BIOS will launch that operating system and hand control over to it. You can enter the BIOS setup by pressing the [**Delete**] key when the machine boots up and begins to show the memory count.

Setup Basics

The table below shows how to use the setup program with the keyboard.

Key	Function
Tab	Moves from one selection to the next
Left/Right Arrow Keys	Changes from one menu to the next
Up/Down Arrow Keys	Moves between selections
Enter	Opens highlighted section
PgUp/PgDn Keys	Changes settings.

Getting Help

Pressing [**F1**] displays a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**] or the [**F1**] key again.

In Case of Problems

If you discover that you have trouble booting the computer after making and saving the changes with the BIOS setup program, restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.
The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are sure of the outcome. TYAN or your system manufacturer has carefully chosen the chipset defaults for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

Setup Variations

Not all systems have the same BIOS setup layout or options. While the basic look and function of the BIOS setup remains more or less the same for most systems, the appearance of your Setup screen may differ from the charts shown in this section. Each system design and chipset combination requires a custom configuration. In addition, the final appearance of the Setup program depends on the system designer. Your system designer may decide that certain items should not be available for user configuration, and remove them from the BIOS setup program.

3.2 Main BIOS Setup

When you enter PhoenixBIOS CMOS Setup Utility, the following screen will appear as below:

```
                          PhoenixBIOS Setup Utility
        Main      Advanced      Security      Power      Boot      Exit

   System Time:              [xx:xx:xx]          Item Specific Help
   System Date:              [xx/xx/xxxx]

   Legacy Diskette A:        [Disabled ]        [Tab], [Shift-Tab], or
                                                [Enter] selects field.
   ▶ SATA Port 1
   ▶ SATA Port 2
   ▶ SATA Port 3
   ▶ SATA Port 4
   ▶ SATA Port 5
   ▶ SATA Port 6
   ▶ Ext. Primary Master
   ▶ Ext. Primary Slave

   ▶ Memory Cache
   ▶ Boot Features

   Installed memory
   Available to OS
   Used by devices

   F1    Help     ↑↓  Select Item   -/+  Change Values    F9  Setup Defaults
   Esc   Exit     ←→  Select Menu   Enter Select   ▶ Sub-Menu  F10 Save and Exit
```

The main menu contains the following menu items:

Main
Use this menu for basic system configuration.

Advanced
Use this menu to set the Advanced Features available on your system.

Security
Use this menu to configure security settings for your system.

Power
Use this menu to configure power options for your system.

Boot
Use this menu to configure boot options for your system.

Exit
This contains the various BIOS exit options.

3.3 Main

In this section, you can alter general features such as the date and time, as well as access to the IDE configuration options. Note that the options listed below are for options that can directly be changed within the Main Setup screen. Users use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
                         PhoenixBIOS Setup Utility
        Main      Advanced      Security      Power      Boot      Exit

    System Time:            [xx:xx:xx]          Item Specific Help
    System Date:            [xx/xx/xxxx]
                                                [Tab], [Shift-Tab], or
    Legacy Diskette A:      [Disabled ]         [Enter] selects field.

    ▶ SATA Port 1
    ▶ SATA Port 2
    ▶ SATA Port 3
    ▶ SATA Port 4
    ▶ SATA Port 5
    ▶ SATA Port 6
    ▶ Ext. Primary Master
    ▶ Ext. Primary Slave

    ▶ Memory Cache
    ▶ Boot Features

    Installed memory
    Available to OS
    Used by devices

    F1   Help      ↑ ↓  Select Item   -/+  Change Values    F9  Setup Defaults
    Esc  Exit      ← →  Select Menu   Enter Select  ▶ Sub-Menu  F10 Save and Exit
```

System Time / Date setup
System Time: Adjusts the system clock.
HHHours (24hr. format): MMMinutes : SSSeconds
System Date: Adjusts the system date.
MMMonths : DDDays : YYYYYYears

Legacy Diskette A
Defines the floppy drive type
Options: **Disabled** / 360K, 5.25 in / 1.2 M, 5.25 in / 720 K, 3.5 in / 1.44 M, 3.5 in **/** 2.88 M, 3.5 in

Installed Memory/Available to OS/Used by devices
This displays the amount of system memory allocated to OS or used by devices. (read only)

3.3.1 SATA Port 1~6/Ext. Primary Master/Slave

Computer detects the hard disk drive type for each drive.
Press [Enter] to view advanced details of the corresponding drive.

```
┌─────────────────────────────────────────────────────────────────────────────┐
│                        PhoenixBIOS Setup Utility                              │
│    Main        Advanced        Security        Power        Boot      Exit    │
├───────────────────────────────────────────────────┬───────────────────────────┤
│                                                    │   Item Specific Help      │
│  Type:                    [Auto]                   ├───────────────────────────┤
│                                                    │ User = your enter         │
│  Multi-Sector Transfers:  [Disabled]               │ parameters of hard-disk   │
│  LBA Mode Control:        [Disabled]               │ drive installed at this   │
│  32 Bit I/O:              [Disabled]               │ connection.               │
│  Transfer Mode:           [Standard]               │ Auto = autotypes hard-    │
│  Ultra DMA Mode:          [Disabled]               │ disk drive installed here.│
│                                                    │ 1-39 = you select pre-    │
│                                                    │ determined type of        │
│                                                    │ hard-disk drive installed │
│                                                    │ here.                     │
│                                                    │ CD-ROM = a CD-ROM         │
│                                                    │ drive is installed here.  │
│                                                    │ ATAPI Removable =         │
│                                                    │ removable disk drive is   │
│                                                    │ installed here.           │
├───────────────────────────────────────────────────┴───────────────────────────┤
│  F1   Help      ↑↓  Select Item   -/+  Change Values     F9  Setup Defaults   │
│  Esc  Exit      ←→  Select Menu   Enter Select   ► Sub-Menu  F10 Save and Exit │
└─────────────────────────────────────────────────────────────────────────────┘
```

The system displays advanced details like the number of heads/cylinders/sectors on the detected disk and the maximum storage capacity of the disk.
This option lets you set the following hard disk parameters:

Type
Selects the type of device connected to the system.
Options: **Auto** / CD/DVD / Not Installed / ARMD

Multi-Sector Transfers
This option allows you to specify the number of sectors per block for multiple sector transfers.
Options: Disabled / 2 Sectors / 4 Sectors / 8 Sectors / **16 Sectors**

LBA Mode Control
Enables or disables LBA Mode.
When LBA is turned on, the BIOS will enable geometry translation. This translation may be done in the same way that it is done in Extended CHS or large mode, or it may be done using a different algorithm called LBA-assist translation. The translated geometry is still what is presented to the operating system for use in Int 13h calls. The difference between LBA and ECHS is that when using ECHS the BIOS translates the parameters used by these calls from the translated geometry to the drive's logical geometry. With LBA, it translates from the translated geometry directly into a logical block (sector) number.
Options: Disabled / **Enabled**

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32 Bit I/O
Enables or disables 32 bit data transfer mode.
Enabling this option causes the PCI hard disk interface controller to bundle together two 16-bit chunks of data from the drive into a 32-bit group, which is then transmitted to the processor or memory. This results in a small performance increase.
Options: Enabled / **Disabled**

Transfer Mode
These modes determine the speed at which data is transferred to and from the drive. The Auto option automatically determines the correct transfer rates.
Options: Auto / Standard / Fast PIO 1 / Fast PIO 2 / Fast PIO 3 / Fast PIO 4 / FPIO 3 / DMA 1 / **FPIO 4 / DMA 2**

Ultra DMA Mode
Enables or disables Ultra DMA Mode.
Ultra DMA (UDMA, or, more accurately, Ultra DMA/33) is a protocol for transferring data between a hard disk drive through the computer's data paths (or bus) to the computer's random access memory (RAM). The Ultra DMA/33 protocol transfers data in burst mode at a rate of 33.3 MBps (megabytes per second), twice as fast as the previous Direct Memory Access (DMA) interface.
Ultra DMA support in your computer means that it will boot (start) and open new applications more quickly. It will also help users of graphics-intensive and other applications that require large amounts of access to data on the hard drive. Ultra DMA uses Cyclical Redundancy Checking (CRC), offering a new level of data protection.
Options: Disabled **/** Mode 0 / Mode 1 / Mode 2 / **Mode 5**

3.3.2 Memory Cache

This setting allows you to tweak the various cache settings for optimal performance of your system.

Press [Enter] to display the various cache settings.

PhoenixBIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit

Memory Cache		Item Specific Help
Cache System BIOS area:	[Write Protect]	
Cache Video BIOS area:	[Write Protect]	Controls caching of
Cache Base 0-512K:	[Write Back]	system BIOS area.
Cache Base 512K-640K:	[Write Back]	
Cache Extended Memory Area:	[Write Back]	
Cache A000 – AFFF:	[Disabled]	
Cache B000 – BFFF:	[Disabled]	
Cache C800 – CBFF:	[Disabled]	
Cache CC00 – CFFF:	[Disabled]	
Cache D000 – D3FF:	[Disabled]	
Cache D400 – D7FF:	[Disabled]	
Cache D800 – DBFF:	[Disabled]	
Cache DC00 – DFFF:	[Disabled]	
Cache E000 – E3FF:	[Write Protect]	
Cache E400 – E7FF:	[Write Protect]	
Cache E800 – EBFF:	[Write Protect]	
Cache EC00 – EFFF:	[Write Protect]	

F1 Help	↑ ↓ Select Item	-/+ Change Values	F9 Setup Defaults
Esc Exit	← → Select Menu	Enter Select ▶ Sub-Menu	F10 Save and Exit

Cache System BIOS Area

This feature is only available when the system BIOS is shadowed. It enables or disables the caching of the system BIOS ROM at F0000h-FFFFFh via the L2 cache. This greatly speeds up accesses to the system BIOS. However, this does not necessarily make the system perform better because the OS does not need to access the system BIOS often.

As such, it would be a waste of L2 cache bandwidth to cache the system BIOS instead of data that are more critical to the system's performance. In addition, if any program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.

Options: uncached / **Write Protect**

Cache Video BIOS Area

This feature is only valid when the video BIOS is shadowed. It enables or disables the caching of the video BIOS ROM at C0000h-C7FFFh via the L2 cache. This greatly speeds up accesses to the video BIOS. However, this does not necessarily make the system perform better because the OS bypasses the BIOS and uses the graphics driver to access the video card's hardware directly.

As such, it would be a waste of L2 cache bandwidth to cache the video BIOS instead of data that are more critical to the system's performance. In addition, if any

program writes into this memory area, it will result in a system crash. So, it is recommended that you write protect this area for optimal system performance.
Options: uncached / **Write Protect**

Cache Base 0-512K
Control caching of 512K base memory.
Options: uncached / Write Through / Write Protect / **Write Back**

Cache Base 512-640K
Control caching of 512K-640K base memory.
Options: Write Through / **Write Back**

Cache Extended Memory Area
Control caching of system memory above one megabyte.
Options: Write Through / **Write Back**

Cache A000-AFFF~ Cache DC00-DFFF
Control caching of the memory blocks.
Options: **Disabled** / USWC Caching / Write Back/ Write Through / Write Protect

Cache E000-E3FF~ Cache EC00-EFFF
Control caching of the memory blocks.
Options: Disabled / Write Back / Write Through / **Write Protect**

3.3.3 Boot Features

This setting allows you to tweak the various boot settings for optimal performance of your system.

Press [Enter] to display the various boot features.

PhoenixBIOS Setup Utility					
Main	Advanced	Security	Power	Boot	Exit
Boot Features				Item Specific Help	
Floppy Check		[Disabled]		Enabled verifies floppy type on boot; disabled speeds boot.	
Halt on Errors		[All Errors]			
Keyboard Error Report		[Enabled]			
Summery screen:		[Enabled]			
Boot-time Diagnostic Screen:		[Enabled]			
QuickBoot Mode:		[Enabled]			
Extended Memory Testing		[Just zero it]			
F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults					
Esc Exit ←→ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit					

Floppy Check

This feature is used to verify floppy type on boot. Selecting [Disabled] will speed the boot process.

Options: **Disabled** / Enabled

Halt on Errors

Select [No Errors] if users don't want to stop POST with any error.

Options: **All Errors** / No Errors / All, But Keyboard

Keyboard Error Report

Enabled BIOS keyboard error report; BIOS will display the keyboard error message & save the event in DMI.

Disabled BIOS keyboard error report; BIOS will not warn & display the error message.

Options: **Enabled** / Disabled

Summary Screen

Enables or disables the display of the summary screen during boot up.

When Summary Screen is Enabled (the default), a Phoenix BIOS Setup Utility summary screen appears during system boot after the power-on self-test (POST). The summary screen lists many of the system setup settings. When this option is set to Disabled, the summary screen does not appear.

Options: **Enabled** / Disabled

Boot-time Diagnostic Screen

This feature is used to display the diagnostic screen during the boot process.

Options: **Enabled** / Disabled

QuickBoot Mode
Allows the system to skip certain tests while booting. This will decrease the time needed to boot the system.
Options: Disabled / **Enabled**

Extended Memory Testing
Determines the tests that will be run on extended memory (memory above 1MB) during boot up.
Options: Normal / **Just zero it** / None

3.4 Advanced

This section facilitates configuring advanced BIOS options for your system.

```
                      PhoenixBIOS Setup Utility
      Main        Advanced      Security     Power      Boot        Exit
   Setup Warning                                    Item Specific Help

   Setting items on this menu to incorrect values may
   cause your system to malfunction.

   ▶ Advanced Chipset Control                       Select options for
   ▶ Advanced Processor Options                     Advanced Chipset
   ▶ I/O Device Configuration                       features.
   ▶ DMI Event Logging

   Reset Configuration Data:        [No]
   Large Disk Access Mode:          [DOS]

   Legacy USB Support:              [Enabled]
   ▶ Hardware Monitor
   ▶ IPMI
   ▶ Console Redirection

   F1   Help      ↑↓  Select Item   -/+   Change Values    F9   Setup Defaults
   Esc  Exit      ←→  Select Menu    Enter Select    ▶ Sub-Menu   F10 Save and Exit
```

NOTE: When an IPMI card is installed, the Hardware Monitor submenu is disabled and the IPMI submenu is enabled, and vice versa.

Reset Configuration Data
If you install a new piece of hardware or modify your computer's hardware configuration, the BIOS will automatically detect the changes and reconfigure the ESCD (Extended System Configuration Data). Therefore, there is usually no need to manually force the BIOS to reconfigure the ESCD.
Select [Yes] if you want to clear the ESCD area.
Options: Yes / **No**

Large Disk Access Mode
This option determines whether a hard drive with more than 1024 cylinders, more than 16 heads and or more than 64 tracks per sector is present on the system. Set this option to **DOS** if such a hard drive is present. Else, set this option to [Other]. Virtually, all modern hard disks have these characters so leave this option at [DOS], unless you know otherwise.
Options: **DOS** / Other

Legacy USB Support:
Enables support for legacy USB.
Options: **Enabled** / Disabled

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3.4.1 Advanced Chipset Control

This section allows you to fine tune the chipset configuration.

```
┌─────────────────────────────────────────────────────────────────────┐
│                     PhoenixBIOS Setup Utility                         │
│     Main      Advanced      Security      Power      Boot      Exit   │
├───────────────────────────────────────────────┬─────────────────────┤
│             Advanced Chipset Control           │ Item Specific Help  │
├───────────────────────────────────────────────┼─────────────────────┤
│                                                │ These items determine│
│  ▶ Integrated Device Control Sub-Menu          │ whether the integrated│
│  ▶ PCI Express Sub-Menu                        │ PCI Devices will be │
│                                                │ Enabled in PCI Config.│
│  WatchDog Mode                  [Disabled]     │ Space.              │
│  WatchDog Timer                 [10 Mins]      │                     │
│                                                │                     │
│  Memory Reclaiming              [Enabled]      │                     │
│                                                │                     │
│  Default Primary Video Adapter  [Auto]         │                     │
│  IGD – Device 2:                [Auto]         │                     │
│  IGD – Device 2, Function 1:    [Auto]         │                     │
│  DVMT 4.0 Mode:                 [Auto]         │                     │
│  Pre-Allocated Memory Size:     [1MB]          │                     │
│  IGD – Memory Size:             [128MB]        │                     │
│  Fixed Graphics Memory:         [xxxxKB]       │                     │
│     DVMT Graphics Memory:       [xxxxKB]       │                     │
│                                                │                     │
│  Azalia Audio                   [Auto]         │                     │
│                                                │                     │
│  Enable Multimedia Timer        [No]           │                     │
│                                                │                     │
│  Serial ATA                                    │                     │
│     Native Mode Operation       [Enabled]      │                     │
│        SATA RAID Enable         [Auto]         │                     │
│        SATA AHCI Enable         [Disabled]     │                     │
│        SATA AHCI Legacy Enable  [Disabled]     │                     │
│                                 [Disabled]     │                     │
├───────────────────────────────────────────────┴─────────────────────┤
│  F1   Help     ↑ ↓  Select Item   -/+  Change Values   F9  Setup Defaults│
│  Esc  Exit     ← →  Select Menu   Enter Select   ▶ Sub-Menu  F10 Save and Exit│
└─────────────────────────────────────────────────────────────────────┘
```

Note: When **DVMT 4.0 Mode** is set to [Auto], **Pre-Allocated Memory Size,**
IGD – Memory Size and **Fixed Graphics Memory** will be auto hidden.

WatchDog Mode
This feature allows you to enable the watchdog function.
POST: Watchdog timer counting, start at Power on, stop at OS Boot
OS: Start at OS Boot
Power on: Start at power on
Options: **Disabled** / POST / OS

Watchdog Timer
When HD time-out occurs, system will auto reboot.
Options: 2 Mins / 4 Mins / 6 Mins / 8 Mins / **10 Mins**

Memory Reclaiming
It allows you to enable or disable the system memory remap function.
Options: **Enabled** / Disabled

Default Primary Video Adapter
Select [IGD] to have Internal Graphics, if supported and enabled, be used for the boot display device. Select [PEG] to have PCI Express Graphics, if supported and enabled, be used for the boot display device. To use PCI Video, select [IGD].
Options: **Auto** / PCI / PEG / IGD

IGD --- Device 2
Enable or Disable the Internal Graphics Device by setting item to the desired value.
Options: **Auto** / Disabled

IGD --- Device 2, Function 1
Enable or Disable Function 1 of the Internal Graphics Device by setting item to the desired value.
Options: **Auto** / Disabled

DVMT 4.0 Mode
Select the configuration of DVMT 4.0 Graphics Memory that Driver will allocate for use by the Internal Graphics Device.
Options: **Auto** / Fixed / DVMT

Pre-Allocated Memory Size
Select the amount of' Pre-Allocated Graphics Memory for use by the Internal Graphics Device.
Options: **1MB** / 8MB

IGD --- Memory Size
Select the amount of the Main Memory that the Internal Graphics Device will use.
Options: **128MB** / 256MB / Max DVMT

Fixed Graphics Memory
Display the fixed graphics memory. (Read only)

DVMT Graphics Memory
Display the DVMT graphics memory. (Read only)

Azalia Audio
This feature is used to configure Azalia audio interface.
Options: **Auto** / Disabled

Enable Multimedia Timer
It is used to enable/disable Multimedia Timer support.
Options: **No** / Yes

Serial ATA
This feature is used to enable the SATA function.
Options: Enabled / **Disabled**

Native Mode Operation
This feature is used to choose Native Mode for ATA. However, certain OS is not supported under Native Mode.
Options: **Auto** / Serial ATA

SATA RAID Enable
When this option is enabled, the Silicon Image RAID BIOS is loaded on system start up, allowing for configuration of hardware RAID arrays. With the SATA RAID ROM option disabled, the drives attached to the controller can only act independently of one another.
Options: Enabled / **Disabled**

SATA AHCI Enable
This item allows you to enable the SATA AHCI functionality.
Options: **Disabled** / Enabled

SATA AHCI Legacy Enable
[Enabled]: SATA and PATA drives are auto-detected and placed in Legacy Mode.
[Disabled]: SATA and PATA drives are auto-detected and placed in Native IDE mode.
Options: **Disabled** / Enabled

3.4.1.1 Integrated Device Control Sub-Menu

```
                        PhoenixBIOS Setup Utility
        Main      Advanced      Security      Power      Boot      Exit
                Integrated Device Control Sub-Menu          Item Specific Help

     ▶ LAN Control Sub-Menu                              These items control
                                                         LAN devices
       USB Dev #29              [Fun #0, 1, 2, 3, 7]
       USB Dev #26              [Fun #0, 1, 2, 7]




     F1   Help      ↑↓  Select Item   -/+  Change Values    F9   Setup Defaults
     Esc  Exit      ←→  Select Menu   Enter Select   ▶ Sub-Menu   F10 Save and Exit
```

USB Dev #29
Controls Dev #29.
Options: **Fun #0, 1, 2, 3, 7** / Fun #0 / Fun#0, 1 / Fun#0, 1, 2 / Fun#0, 1, 2, 3 / Disabled

USB Dev #26
Controls Dev #26.
Options: **Fun #0, 1, 2, 7** / Fun#0, 7 / Fun#0, 1, 7 / Disabled

3.4.1.1.1 LAN Control Sub-Menu

```
                        PhoenixBIOS Setup Utility
        Main      Advanced      Security      Power      Boot      Exit
                    LAN Control Sub-Menu                Item Specific Help

   LAN1                                  [Enabled]      Enable/Disable for the
   LAN1 Option ROM Scan:                 [Disabled]     integrated LAN device.

   LAN2                                  [Enabled]
   LAN2 Option ROM Scan:                 [Disabled]




   F1    Help       ↑ ↓  Select Item    -/+  Change Values     F9   Setup Defaults
   Esc   Exit       ← →  Select Menu    Enter Select   ▶ Sub-Menu  F10 Save and Exit
```

LAN1 / LAN2
Enable/Disable for the intergrated LAN device.
Options: **Enabled** / Disabled

LAN1 / LAN2 Option ROM Scan
Initialize device expansion ROM.
Options: **Disabled** / Enabled

3.4.1.2 PCI Express Sub-Menu

```
                        PhoenixBIOS Setup Utility
        Main      Advanced      Security      Power      Boot      Exit
 ┌──────────────────────────────────────────────┬──────────────────────────┐
 │            PCI Express Sub-Menu              │    Item Specific Help     │
 │                                              │                           │
 │  PCI Express Base Address                    │  These items are for      │
 │  GMCH Base Address                           │  debugging the PCI        │
 │  DMI Base Address                            │  Express Graphics Port.   │
 │  Egress Port Base Address                    │                           │
 │  --------------------------------------------│                           │
 │  ▶ PCI-E1 Sub-Menu                           │                           │
 │                                              │                           │
 │  ICH9 RCB Base Address                       │                           │
 │  --------------------------------------------│                           │
 │  ▶ PCI-E2 Sub-Menu                           │                           │
 │                                              │                           │
 ├──────────────────────────────────────────────┼──────────────────────────┤
 │  F1   Help      ↑↓  Select Item    -/+  Change Values    F9  Setup Defaults │
 │  Esc  Exit      ←→  Select Menu    Enter Select  ▶ Sub-Menu  F10 Save and Exit │
 └────────────────────────────────────────────────────────────────────────┘
```

PCI Express Base Address / GMCH Base Address / DMI Base Address / Egress Port Base Address / ICH9 RCB Base Address
Read only.

3.4.1.2.1 PCI-E1 Sub-Menu

```
                      PhoenixBIOS Setup Utility
     Main        Advanced      Security      Power      Boot        Exit
                  PEI-E1 Sub-Menu                 Item Specific Help

 PCI Express Graphics Port            [Auto]       Disabled --- Port always
 ------------------------------------------------- disabled.
                                                   Enabled --- Port always
 PEG Enabled                                       enabled.
 PEG Number                                        Auto --- Only enable if
 PEG Width                                         card found.
 ------------------------------------------------- Debug --- only enable if
                                                   card found.  Don't force
 PEG Slot Number                                   link width.
 PEG Power Limit
 PEG Slot Card Detect




 F1   Help     ↑ ↓  Select Item  -/+  Change Values   F9  Setup Defaults
 Esc  Exit     ← →  Select Menu   Enter Select  ▶ Sub-Menu  F10 Save and Exit
```

PCI Express Graphics Port
This feature is used to control the PCI Express Graphics port.
Options: **Auto** / Enabled / Disabled / Debug

PEG Enabled / PEG Number / PEG Width / PEG Slot Number / PEG Power Limit / PEG Slot Card Detect
Read only.

3.4.1.2.2 PCI-E2 Sub-Menu

PhoenixBIOS Setup Utility					
Main	**Advanced**	Security	Power	Boot	Exit

PCI-E2 Sub-Menu	Item Specific Help
PCI-E Port 1 [Auto] -- Port #1 Enabled Port #1 Number Port #1 Width -- Port #1 Slot Number Port #1 Power Limit Port #1 Slot Card Detect	Disabled --- Port always disabled. (If Port #1 is disabled, then the rest of the Ports will also be disabled.) Enabled --- Port always enabled. Auto --- Only enable if card found.

F1	Help	↑↓	Select Item	-/+	Change Values	F9	Setup Defaults
Esc	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

PCI Express Port #1
This feature is used to control the PCI Express Port #1.
Options: **Auto** / Enabled / Disabled

Port #1 Enabled / Port #1 Number / Port #1 Width / Port #1 Slot Number / Port #1 Power Limit / Port #1 Slot Card Detect
Read only.

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3.4.2 Advanced Processor Options

This section allows you to fine-tune the processor options.

```
                    PhoenixBIOS Setup Utility
      Main       Advanced      Security      Power       Boot        Exit
            Advanced Processor Options          Item Specific Help

  Hyperthreading:                 [Enabled]        Enabling
  Core Multi-Processing           [Enabled]        Hyperthreading
  Single Logical Proc. Mode       [Disabled]       activates additional
                                                   CPU threads.  These
  Thermal Management 2            [Enabled]        threads may appear as
  Set Max Ext CPUID = 3           [Disabled]       additional processors
  C1 Enhanced Mode                [Enabled]        but will share some
  PECI Interface                  [Enabled]        resources with the other
  Intel® Virtualization Technology [Disabled]      threads within the
  No Execute Mode Mem Protection  [Enabled]        physical package.

  Frequency Ratio                 [Default]
  Frequency Hi Ratio              [X 12]
  Processor Power Management       [GV1/GV3 Only]


  F1    Help      ↑ ↓  Select Item    -/+   Change Values     F9   Setup Defaults
  Esc   Exit      ← →  Select Menu    Enter Select   ▶ Sub-Menu  F10 Previous Values
```

Hyperthreading
Enable this only if you have an Intel Hyper Threading processor.
Enabling Hyperthreading activates additional CPU threads. These threads may
appear as additional processors but will share some resources with the other
threads within the physical package.
Options: **Enabled** / Disabled

Core Multi-processing
Determines whether the second core is enabled.
[Disabled]: the second core is disabled
[Enabled]: the second core is enabled
Options: **Disabled** / Enabled

Single Logical Proc. Mode
Multiple Core Processor. Only single thread and core is enabled.
Options: **Disabled** / Enabled

Thermal Management 2
Select between TM1 and TM2.
Options: **Disabled** / Enabled

Set Max Ext CPUID = 3
Sets Max CPUID extended function value to 3.
Options: **Disabled** / Enabled

C1 Enhanced Mode
This feature is used to enable the C1 Enhanced mode.
Options: **Enabled** / Disabled

PECI Interface
It is used to enable/disable the Platform Environment Control Interface (PECI).
Options: Disabled / **Enabled**

Intel ® Virtualization Technology
Intel Virtualization Technology is a set of platform features that support virtualization of platform hardware and multiple software environments.
Options: **Disabled** / Enabled

No Execute Mode Mem Protection
Execution protection prevents code execution from data pages such as the default heap, various stacks, and memory pools. Protection can be applied in both user and kernel-mode. Windows XP SP2 supports this technology.
Options: **Enabled** / Disabled

Frequency Ratio
Select the internal frequency multiplier of the CPU.
Options: BIOS CPU Detect / **Default**

Frequency Hi Ratio
Select the Hi ratio for the Intel Speedstep CPU. Selecting unsupported ratios will cause hang. Clear CMOS to recover.
Options: BIOS CPU Detect / **x10**

Processor Power Management
Thermal Management throttles the processor back as it reaches its maximum operating temperature. Throttling reduces the number of processing cycles, thereby diminishing the heat dissipation of the CPU. This cools the unit. Once the CPU has reached a safe operating temperature, thermal throttling is automatically disabled, and normal full speed processing begins again.
Options: **GV1/GV3 only** / Disabled

3.4.3 I/O Device Configuration

This setting allows you to configure I/O devices.

```
                     PhoenixBIOS Setup Utility
      Main      Advanced      Security     Power      Boot       Exit
              I/O Device Configuration            Item Specific Help

 Floppy disk controller         [Enabled]       Configure using these
 Serial port A:                 [Enabled]       options:
   Base I/O address:            [3F8]
   Interrupt:                   [IRQ4]          [Disabled] No
 Serial port B:                 [Enabled]       configuration
   Mode                         [Normal]
   Base I/O address             [2F8]           [Enabled]  User
   Interrupt:                   [IRQ3]          configuration

                                                [Auto] BIOS or OS
                                                chooses configuration

                                                (OS Controlled)
                                                Displayed when
                                                controlled by OS

 F1    Help     ↑↓  Select Item   -/+  Change Values      F9   Setup Defaults
 Esc   Exit     ←→  Select Menu   Enter Select   ▶ Sub-Menu  F10 Previous Values
```

Floppy disk Controller
This defines how the floppy disk controller is detected and configured.
Options: Disabled / **Enabled** / Auto

Serial Port A/B:
This defines how the serial port A/B is detected and configured.
Options: Disabled / **Enabled** / Auto

Base I/O Address:
Set the base I/O address for serial port A/B.
Options: **3F8 /** 2F8 / 3E8 / 2E8

Interrupt:
Set the interrupt for serial port A/B.
Options: IRQ3 / **IRQ4**

Mode
Set the mode for serial port B.
Options: IR / **Normal**

3.4.4 DMI Event Logging

This section allows you to fine tune the DMI Event Logging configuration.

```
┌─────────────────────────────────────────────────────────────────────┐
│                     PhoenixBIOS Setup Utility                         │
│     Main        Advanced      Security       Power      Boot    Exit  │
├──────────────────────────────────────────────┬──────────────────────┤
│             DMI Event Logging                 │  Item Specific Help   │
├──────────────────────────────────────────────┴──────────────────────┤
│  Event log validity                            Report the validity of │
│  Event log capacity                            the DMI event log      │
│                                                                        │
│  View DMI event log                                                   │
│  Event Logging                  [Enabled]                             │
│                                                                        │
│  Mark DMI events as read                                             │
│  Clear all DIM event logs       [No]                                 │
├──────────────────────────────────────────────────────────────────────┤
│  F1   Help    ↑ ↓  Select Item   -/+  Change Values   F9  Setup Defaults │
│  Esc  Exit    ← →  Select Menu   Enter Select  ▶ Sub-Menu  F10 Previous Values │
└──────────────────────────────────────────────────────────────────────┘
```

Event Log Capacity
It reports the space available in the DMI event log. If set to [Full], the event log has no more available space to store DMI events. (read only)

Event Log Validity
It reports the validity of the DMI event log. (read only)

View DMI Event Log
It allows you to view the contents of the DMI event log. (read only)

Event Logging
Select [Enabled] to allow logging of DMI events.
Options: **Enabled** / Disabled

Mark DMI Events as Read
Press [Enter] to mark DMI events as read.

Clear all DMI Event logs
When set to [Enabled], BIOS event log will be cleared.
Options: **Disabled** / Enabled

3.4.5 Hardware Monitor

This section allows you to fine tune the Hardware Monitor configuration.

```
                    PhoenixBIOS Setup Utility
      Main      Advanced      Security      Power       Boot        Exit
                    Hardware Monitor                Item Specific Help

   ▶ Voltage Monitoring

   CPU FAN1
   FAN2
   FAN3
   FAN4
   FAN5
   FAN6

   CPU Temp.
   Ambient1 Temp.
   Ambient2 Temp.

   FAN Fail LED Indicator            [Disabled]
   Auto FAN Control                  [Disabled]

   F1    Help     ↑ ↓  Select Item   -/+   Change Values      F9   Setup Defaults
   Esc   Exit     ← →  Select Menu   Enter Select   ▶ Sub-Menu   F10 Previous Values
```

CPU FAN1/FAN2/FAN3/FAN4/FAN5/FAN6/CPU Temp./Ambient1 Temp./
Ambient2 Temp.
Items can not be modified in user mode. Read only.

FAN Fail LED Indicator
When it is set to [Enabled], the LED will be on when the FAN failed.
Options: **Disabled** / Enabled

Auto Fan Control:
This feature is used to set function of Auto Mode Fan Control.
Options: Enabled / **Disabled**

3.4.5.1 Voltage Monitoring Sub-Menu

PhoenixBIOS Setup Utility					
Main	**Advanced**	Security	Power	Boot	Exit

Voltage Monitoring	Item Specific Help
CPU Vcore Vddr2 5V 12V 3.3V	

F1 Help	↑↓ Select Item	-/+ Change Values		F9 Setup Defaults	
Esc Exit	←→ Select Menu	Enter Select	▶ Sub-Menu	F10 Previous Values	

All items on this submenu can not be modified in user mode. Read only.

3.4.6 IPMI

This section allows you to configure the IPMI settings. (This submenu will appear when an IPMI card is installed.)

```
                        PhoenixBIOS Setup Utility
       Main      Advanced      Security    Power      Boot      Exit
                              IPMI                   Item Specific Help

    ▶ System Event Log                              Display the System
    ▶ System Event Log (list mode)                  Event Log
    ▶ Realtime Sensor Data

    IPMI Specification Version        2.0
     BMC Firmware Version             0.00.00000000
    System Event Logging              [Enabled]
    Clear System Event Log            [Disabled]
    Existing Event Log number         7
    Remaining Event Log number        (unknown)
    Event Log Control
      SYS Firmware Progress           [Disabled]
      BIOS POST Errors                [Enabled]
    BIOS POST Watchdog                [Disabled]
    OS boot Watchdog                  [Disabled]
      Timer for loading OS (SEC)      [10]
      Time out action                 [No action]

    F1   Help     ↑↓  Select Item   -/+  Change Values    F9  Setup Defaults
    Esc  Exit     ←→  Select Menu   Enter Select  ▶ Sub-Menu  F10 Save and Exit
```

IPMI Specification Version / BMC Firmware Version
It displays the version of the IPMI Specification and BMC Firmware. (Read only)

System Event Logging
Select [Enabled] to allow logging of system events.
Options: **Enabled** / Disabled

Clear System Event Log
When set to [Enabled], system event log will be cleared.
Options: **Disabled** / Enabled

Existing Event Log number / Remaining Event Log number
It displays the number of existing event logs and remaining event logs. (Read only)

SYS Firmware Progress
It records the continual development of BIOS POST.
Options: **Disabled /** Enabled

BIOS POST Errors
Enabled -> BIOS will halt & display error message if there is any POST error .
Disabled -> BIOS will not halt if there is any POST error.
Options: Disabled / **Enabled**

BIOS POST Watchdog
Select [Disabled] if users don't want to stop POST with any error.
Options: **Disabled** / Enabled

OS Boot Watchdog
Disable or select Watchdog Timer count mode.
Options: **Disabled** / mSecond / Second / Minute

Timer for loading OS (SEC)
Watch dog timer value.
Options: **10** - 255

Time Out Action
Select what to do when Watchdog time out.
Options: **No Action** / System Reset

3.4.6.1 System Event Log Sub-Menu

```
┌─────────────────────────────────────────────────────────────────────┐
│                    PhoenixBIOS Setup Utility                          │
│     Main        Advanced      Security      Power      Boot      Exit │
├─────────────────────────────────────────────────────────────────────┤
│                         System Event Log                              │
├─────────────────────────────────────────────────────────────────────┤
│                                                                       │
│    SEL Entry Number =  1                                              │
│    SEL Record ID =       0001                                         │
│    SEL Record Type =   02 - System Event Record                       │
│    Timestamp =               03.17.2073  13:10:06                     │
│    Generator ID =           01 00                                     │
│    SEL Message Rev =   04                                             │
│    Sensor Type =            0E - POST Memory Resize                    │
│    Sensor Number =       00 - (unknown)                               │
│    SEL Event Type =      6F - Sensor-specific                         │
│    Event Description =   POST Memory Resize                           │
│    SEL Event Data =      A0 00 00                                     │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│ F1   Help      ↑ ↓  Select Item   -/+  Change Values   F9  Setup Defaults │
│ Esc  Exit      ← →  Select Menu   Enter Select  ▶ Sub-Menu  F10 Previous Values │
└─────────────────────────────────────────────────────────────────────┘
```

All items on this submenu can not be modified in user mode. Read only.

3.4.6.2 System Event Log (list mode) Sub-Menu

```
┌─────────────────────────────────────────────────────────────────────┐
│                    PhoenixBIOS Setup Utility                         │
│     Main      Advanced      Security      Power      Boot      Exit   │
├─────────────────────────────────────────────────────────────────────┤
│                    System Event Log (list mode)                      │
│                                                                       │
│     Event ID      Sensor Name      Sensor Type       Date/Time Stamp  │
│                                                                       │
│  ▶   0007         V5VSB              Voltage          03.17.2073 13:10:08 │
│                        Lower Critical Going Low, Assertion            │
│                                                                       │
│                                                                       │
│                                                                       │
├─────────────────────────────────────────────────────────────────────┤
│  F1   Help     ↑ ↓  Select Item    -/+  Change Values    F9  Setup Defaults │
│  Esc  Exit     ← →  Select Menu   Enter Select   ▶ Sub-Menu  F10 Previous Values │
└─────────────────────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────────────┐
│                    PhoenixBIOS Setup Utility                         │
│     Main      Advanced      Security      Power      Boot      Exit   │
├─────────────────────────────────────────────────────────────────────┤
│  [0007         V5VSB               Voltage           03.17.2073 13:10:08] │
│                                                                       │
│     SEL Entry Number =  7                                            │
│     SEL Record ID =        0007                                      │
│     SEL Record Type =   02 - System Event Record                     │
│     Timestamp =          03.17.2073  13:10:06                         │
│     Generator ID =       20 00                                       │
│     SEL Message Rev =  04                                            │
│     Sensor Type =        02 - Voltage                                │
│     Sensor Number =     57 - V5VSB                                   │
│     SEL Event Type =    01 - Threshold                               │
│     Event Description =  Lower Critical Going Low, Assertion          │
│     SEL Event Data =     52 81 B5                                     │
├─────────────────────────────────────────────────────────────────────┤
│  F1   Help     ↑ ↓  Select Item    -/+  Change Values    F9  Setup Defaults │
│  Esc  Exit     ← →  Select Menu   Enter Select   ▶ Sub-Menu  F10 Previous Values │
└─────────────────────────────────────────────────────────────────────┘
```

All items on this submenu can not be modified in user mode. Read only.

3.4.6.3 Realtime Sensor Data Sub-Menu

	PhoenixBIOS Setup Utility				
Main	**Advanced**	Security	Power	Boot	Exit
		Realtime Sensor Data			
Sensor Type	Sensor Name	Sensor Data	Sensor Units	Lower Limit	Upper Limit
Temp					
	LocalTemp2	0.00	degrees C	0.00	59.00
	H1_THERM	0.00	degrees C	0.00	75.00
	LocalTemp1	0.00	degrees C	0.00	59.00
	VTIN2	0.00	degrees C	0.00	70.00
	H0_THERMP	0.00	degrees C	0.00	75.00
	VTIN1	29. 00	degrees C	0.00	70.00
	SYS_TEMP	-127.00	degrees C	0.00	70.00
Voltage					
	H0_DDRII_1.8Run	0.00	Volts	1.58	2.02

F1 Help	↑ ↓ Select Item	-/+ Change Values		F9	Setup Defaults
Esc Exit	← → Select Menu	Enter Select	▶ Sub-Menu	F10	Previous Values

All items on this submenu can not be modified in user mode. Read only.

3.4.7 Console Redirection

This section allows you to configure the Console Redirection.

```
                        PhoenixBIOS Setup Utility
      Main        Advanced      Security       Power       Boot       Exit
                    Console Redirection            Item Specific Help

  Com Port Address              [Disabled]        If enabled, it will use a
                                                  port on the
  Baud Rate                     [19.2K]           motherboard.
  Console Type                  [VT 100]
  Flow Control                  [CTS/RTS]
  Console connection:           [Direct]
  Continue C. R. after POST:    [Off]




  F1   Help     ↑↓  Select Item   -/+  Change Values   F9  Setup Defaults
  Esc  Exit     ←→  Select Menu  Enter Select  ▶ Sub-Menu  F10 Save and Exit
```

Com Port Address
Selects Com Port on BMC or motherboard.
Options: **Disabled** / On-board COM A / On-board COM B

Baud Rate
Enables the specified baud rate.
Options: **19.2K** / 300 / 1200 / 2400 / 9600 / 38.4K / 57.6K / 115.2K

Console Type
Enables the specified console type.
Options: **VT100** / VT100, 8bit / PC-ANSI 7bit / PC ANSI / VT100+ / VT-UTF8

Flow Control
Enables Flow Control.
Options: None / XON/XOFF / **CTS/RTS**

Console Connection
It indicates whether the console is connected directly to the system or a modem is used to connect.
Options: **Direct** / via Modem

Continue C.R. after POST
Enables Console Redirection after OS has loaded.
Options: **Off** / On

3.5 Security

These settings allow you to configure the security options for your system.

```
                         PhoenixBIOS Setup Utility
     Main         Advanced      Security      Power        Boot        Exit

                                                         Item Specific Help
 Supervisor Password Is:
 User Password Is:

 Set Supervisor Password
 Set User Password

 Disk access                    [Supervisor]
 Fixed disk boot sector         [Normal]
 Password on boot:              [Disabled]



 F1   Help     ↑ ↓  Select Item   -/+   Change Values     F9  Setup Defaults
 Esc  Exit     ← →  Select Menu   Enter Select   ▶ Sub-Menu   F10 Save and Exit
```

Supervisor / User Password Is
The system displays the current supervisor and user passwords.

Set Supervisor Password
This option allows the supervisor to set the supervisor password to restrict access to the BIOS settings.

Set User Password
This option allows the user to set the user password.

Diskette access
This option allows the user to control access to diskette drives.
Options: **Supervisor** / Disabled

Fixed disk boot sector
This option allows the user to write protect boot sector on hard disk to protect against viruses.
Options: **Normal** / Write Protect

Password on boot
When enabled, the system will ask for a password at every boot. The system will continue booting only if the correct password is entered. If the wrong password is entered three times, the system will automatically shut down.
Options: **Disabled** / Enabled

3.6 Power

Use this screen to select options for the Power Settings Configuration.

```
                        PhoenixBIOS Setup Utility
     Main        Advanced      Security      Power       Boot       Exit
                                                    Item Specific Help
  ACPI Sleep Mode              [S1/S3]
  Resume on Time              [Off]
  Resume Time                                   Select one of the ACPI
  Chassis Intrusion detect     [No]             power states: S1, S2, or
  Power On By PCI             [Disabled]         S3. If selected, the
  After Power Failure          [Stay Off]        corresponding power
                                                 state will support.

  F1   Help     ↑ ↓  Select Item   -/+  Change Values    F9   Setup Defaults
  Esc  Exit     ← →  Select Menu   Enter Select  ► Sub-Menu  F10 Previous Values
```

ACPI Sleep Mode
Select one of the ACPI power states: S1, S2, or S3. If selected, the corresponding
power state will support.
Options: **S1/S3** / S1 / S3

Resume On Time
When enabled, this allows the system to be worked up at a specified time. This time
is specified by the Resume Time parameter.
Options: **Off** / On

Resume Time
This option allows the user to specify the time when the system is to wake up.

Chassis Intrusion Detect
This feature is used to enable/disable the function: when chassis open event is
detected, BIOS will record the event.
Options: **No** / Yes

Power On By PCI
This option allows you to power on the system by PCI or PCI-X card. When enabled,
an input signal from PME on the PCI card awakens the system from a S5 state.
Options: Enabled / **Disabled**

After Power Failure
Sets the mode of operation if an AC/Power Loss occurs. The two modes are:
[Enabled]: restores the previous power state before loss occurred.
[Disabled]: keeps the power off until the power button is pressed.
Options: Power On / Stay Off / **Last State**

3.7 Boot

Use this screen to select options for the Boot Settings Configuration.

```
                         PhoenixBIOS Setup Utility
      Main        Advanced      Security      Power       Boot       Exit

                                                     Item Specific Help
   Boot priority order



   Excluded from boot order



   F1    Help      ↑ ↓   Select Item    -/+   Change Values      F9  Setup Defaults
   Esc   Exit      ← →   Select Menu    Enter Select   ▶ Sub-Menu  F10 Save and Exit
```

Boot Priority Order
It shows the boot priority for installed devices.

Excluded from boot order
It lists devices to be excluded from boot order.

3.8 Exit

These settings set the exit options on your system.

```
                        PhoenixBIOS Setup Utility
     Main       Advanced     Security     Power      Boot      Exit

                                                   Item Specific Help
  Exit Saving Changes
  Exit Discarding Changes
                                                   Exit system Setup and
  Load Setup Defaults                              save your changes to
  Discard Changes                                  CMOS.
  Save Changes




  F1   Help      ↑ ↓  Select Item   -/+  Change Values   F9  Setup Defaults
  Esc  Exit      ← → Select Menu   Enter Select  ► Sub-Menu  F10 Save and Exit
```

Exit Saving Changes
This exits BIOS setup after saving the changes made.

Exit Discarding Changes
This exits BIOS setup after discarding the changes made.

Load Setup Defaults
This loads the factory default values.

Discard Changes
This discards all changes made without exiting BIOS setup.

Save Changes
This saves all changes made without exiting BIOS setup.

Chapter 4: Diagnostics

Note: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN website at http://www.tyan.com.

4.1 Beep Codes

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. For example, if the BIOS POST can initialize the video but an error occurs, an error message will be displayed. If it cannot display the message, it will report the error as a series of beeps.

The most common type of error is a memory error.

Before contacting your vendor or TYAN Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

4.2 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN web site: http://www.tyan.com/

Note: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

4.3 Phoenix BIOS Post Code

Code	Beeps / Description	Code	Beeps / Description
02h	Verify Real Mode	32h	Test CPU bus-clock frequency
03h	Disable Non-Maskable Interrupt (NMI)	33h	Initialize Phoenix Dispatch Manager
04h	Get CPU type	36h	Warm start shut down
06h	Initialize system hardware	38h	Shadow system BIOS ROM
08h	Initialize chipset with initial POST values	3Ah	Autosize cache
09h	Set IN POST flag	3Ch	Advanced configuration of chipset registers
0Ah	Initialize CPU registers	3Dh	Load alternate registers with CMOS values
0Bh	Enable CPU cache	42h	Initialize interrupt vectors
0Ch	Initialize caches to initial POST values	45h	POST device initialization
0Eh	Initialize I/O component	46h	2-1-2-3. Check ROM copyright notice
0Fh	Initialize the local bus IDE	48h	Check video configuration against CMOS
10h	Initialize Power Management	49h	Initialize PCI bus and devices
11h	Load alternate registers with initial POST values	4Ah	Initialize all video adapters in system
12h	Restore CPU control word during warm boot	4Bh	QuietBoot start (optional)
13h	Initialize PCI Bus Mastering devices	4Ch	Shadow video BIOS ROM
14h	Initialize keyboard controller	4Eh	Display BIOS copyright notice
16h	1-2-2-3. BIOS ROM checksum	50h	Display CPU type and speed
17h	Initialize cache before memory autosize	51h	Initialize EISA board
18h	8254 timer initialization	52h	Test keyboard
1Ah	8237 DMA controller initialization	54h	Set key click if enabled
1Ch	Reset Programmable Interrupt Controller	58h	2-2-3-1. Test for unexpected interrupts
20h	1-3-1-1. Test DRAM refresh	59h	Initialize POST display service
22h	1-3-1-3. Test 8742 KBD Controller	5Ah	Display prompt "Press F2 to enter SETUP"
24h	Set ES segment register to 4 GB	5Bh	Disable CPU cache
26h	Enable A20 line	5Ch	Test RAM between 512 and 640 KB
28h	Autosize DRAM	60h	Test extended memory
29h	Initialize POST Memory Manager	62h	Test extended memory address lines
2Ah	Clear 512 KB base RAM	64h	Jump to UserPatch1
2Ch	1-3-4-1. RAM failure on address	66h	Configure advanced cache registers
2Eh	1-3-4-3. RAM failure on data bits of low byte of	67h	Initialize Multi Processor APIC

Code	Beeps / Description	Code	Beeps / Description
	memory bus		
2Fh	Enable cache before system BIOS shadow	68h	Enable external and CPU caches
30h	1-4-1-1. RAM failure on data bits of high byte of memory bus	69h	Setup System Management Mode (SMM) area
6Ah	Display external L2 cache size	A2h	Check key lock
6Bh	Load custom defaults (optional)	A4h	Initialize Typematic rate
6Ch	Display shadow-area message	A8h	Erase F2 prompt
6Eh	Display possible high address for UMB recovery	AAh	Scan for F2 key stroke
70h	Display error messages	ACh	Enter SETUP
72h	Check for configuration errors	AEh	Clear Boot flag
76h	Check for keyboard errors	B0h	Check for errors
7Ch	Set up hardware interrupt vectors	B2h	POST done - prepare to boot operating system
7Eh	Initialize coprocessor if present	B4h	One short beep before boot
80h	Disable onboard Super I/O ports and IRQs	B5h	Terminate QuietBoot (optional)
81h	Late POST device initialization	B6h	Check password (optional)
82h	Detect and install external RS232 ports	B9h	Prepare Boot
83h	Configure non-MCD IDE controllers	BAh	Initialize DMI parameters
84h	Detect and install external parallel ports	BBh	Initialize PnP Option ROMs
85h	Initialize PC-compatible PnP ISA devices	BCh	Clear parity checkers
86h.	Re-initialize onboard I/O ports.	BDh	Display MultiBoot menu
87h	Configure Motherboard Devices	BEh	Clear screen (optional)
88h	Initialize BIOS Data Area	BFh	Check virus and backup reminders
89h	Enable Non-Maskable Interrupts (NMIs)	C0h	Try to boot with INT 19
8Ah	Initialize Extended BIOS Data Area	C1h	Initialize POST Error Manager (PEM)
8Bh	Test and initialize PS/2 mouse	C2h	Initialize error logging
8Ch	Initialize floppy controller	C3h	Initialize error display function
8Fh	Determine number of ATA drives (optional)	C4h	Initialize system error handler
90h	Initialize hard-disk controllers	C5h	PnPnd dual CMOS (optional)
91h	Initialize local-bus hard-disk controllers	C6h	Initialize notebook docking (optional)
92h	Jump to UserPatch2	C7h	Initialize notebook docking late
93h	Build MPTABLE for multi-processor boards	C8h	Force check (optional)

Code	Beeps / Description	Code	Beeps / Description
95h	Install CD ROM for boot	C9h	Extended checksum (optional)
96h	Clear huge ES segment register	D2h	Unknown Interrupt
97h	Fixup Multi Processor table	80h	Chipset Init
98h	1-2. Search for option ROMs.	81h	Bridge Init
99h	Check for SMART Drive (optional)	82h	Initialize the CPU
9Ah	Shadow option ROMs	83h	Initialize system timer
9Ch	Set up Power Management	84h	Initialize system I/O
9Dh	Initialize security engine (optional)	85h	Check force recovery boot
9Eh	Enable hardware interrupts	86h	Checksum BIOS ROM
9Fh	Determine number of ATA and SCSI drives	87h	Go to BIOS
A0h	Set time of day	89h	Set Huge Segment
88h	Initialize Multi Processor	92h	Initialize Run Time Clock
8Ah	Initialize OEM special code	93h	Initialize video
8Bh	Initialize PIC and DMA	8Fh	Initialize System Management Mode
8Ch	Initialize Memory type	94h	Output one beep before boot
8Dh	Initialize Memory size	95h	Boot to Mini DOS
8Eh	Shadow Boot Block	96h	Clear Huge Segment
90h	System memory test	97h	Boot to Full DOS
91h	Initialize interrupt vectors		

Appendix: SMDC Information

Overview

Tyan Server Management Daughter Card (SMDC) is a powerful yet cost-efficient solution for high-end server management hardware packages. Tyan's goal is to provide remote system monitoring and control even when the operating system is absence or simply fails. This empowers Tyan's server board with advanced industrial-standard features.

Tyan SMDC is a snap-in card that provides essential server management solution. It enables any IT Manager by providing multi-interfaces to access the hardware remotely and perform **monitor**, **control** and **diagnose** activities effectively.

Tyan SMDC is not a peripheral card. Unlike regular peripheral card such as AGP card, Network card or SCSI card, SMDC does not require any hardware specific driver. As long as a standby power comes into the system, SMDC will begin looking after the system.

Tyan SMDC provides diversified methods to communicate with the hardware. IT manager has the flexibility to choose among *Keyboard Controller Style* (KCS), *Block Transfer* (BT) style, Intelligent Chassis Management Bus (ICMB), Intelligent Platform Management Bus (IPMB), Emergency Management Port (EMP) and standard IPMI-Over-LAN communication as defined in latest IPMI 1.5 specification.

Tyan SMDC is compatible with all IPMI-compliance software as well as Tyan System Operator™ (TSO) software package.

By adding SMDC, Tyan's server board becomes a highly manageable and IPMI compatible system with all the advanced features suggesting in IPMI Spec.

More detailed information on Tyan's SMDC card can be found on our website:
http://www.tyan.com

Features of Tyan Server Management

Monitor various system components remotely
-such as fans, processor temperature, and more

Remote power on and power off

Console redirect
-the ability to view system remotely

Alert and error actions
-such as audible beep, e-mail, power down and reboot

SMDC runs on stand-by power
-the SMDC will continue to function, even if the system is not powered on

How SMDC and TSO Work

The brief descriptions below will help explain how these items function.

	Agent – a system with SMDC installed The SMDC is installed in the Agent system that uses a compatible/supported Tyan motherboard.
	Manager – manages the Agent The Manger is set up to manage the Agent that has the SMDC. The Manager and Agent should be located in the same place.
	Console – communicates with Manager The Console is used to monitor and control the Agent through the Manager.

Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path, can carry. Greater bandwidth, then, also results in greater speed.

BBS (BIOS Boot Specification): is a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails for some reason. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, and provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data, usually from an application, though it is also used when printing, and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it, all at once, to a disk drive. While this improves system performance --- reading to or writing from a disk drive a single time is much faster than doing so repeatedly --- there is also the possibility of losing your data should the system crash. Information stored in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times, since the needed information is stored in the SRAM instead of in the slow DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Cache size: refers to the physical size of the cache onboard. This should not be confused with the cacheable area, which is the total amount of memory which can be scanned by the system in search of data to put into the cache. A typical setup would be a cache size of 512KB, and a cacheable area of 512MB. In this case, up to 512KB of the main memory onboard is capable of being cached. However, only 512KB of this memory will be in the cache at any given moment. Any main memory above 512MB could never be cached.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): is a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM sockets, because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with

IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

Doze mode: in this mode, only the CPU's speed is slowed.
DRAM (Dynamic RAM): widely available, very affordable form of RAM which has the unfortunate tendency to lose data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN's BIOS updates can be found at http://www.tyan.com

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Fault-tolerance: a term describing a system where one component can quickly be replaced without causing a loss of service, such as in a RAID system.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX, although TYAN also makes some Baby-AT and ATX Footprint boards.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

Handshaking: a process where two devices initiate communications. One device, typically the server, sends a message to another device, typically a client, in order to request establishment of a communications channel. The two devices will then exchange messages back and forth in order to settle on a communications protocol.

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact

Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

I/O (Input/Output): the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

Initial Program Load (IPL): a feature built into BBS-compliant devices, describing those devices as capable of loading and executing an OS, as well as being able to provide control back to the BIOS if the loading attempt fails.

IPL: see Initial Program Load.

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

ISA (Industry Standard Architecture): a slower 8- or 16-bit bus (data pathway).

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This is most common when the system sends data out to a peripheral device, and it waiting for the peripheral to send some data back (peripherals tend to be slower than onboard system components).

Mirroring: see RAID.

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

OEMs (Original Equipment Manufacturers): Compaq or IBM package other companies' motherboards and hardware inside their case and sell them.

Parallel port: transmits the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

PM timers (Power Management timers): software timers that count down the number of seconds or minutes until the system times out and enters sleep, suspend, or doze mode.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Novice end users can simply plug them into a computer that is running on a Plug-n-Play aware operating system (such as Windows 98), and go to work. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

PXE (Preboot Execution Environment): one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was designed to define a standard set of preboot protocol services within a client, towards the goal of allowing networked-based booting to boot using industry standard protocols.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly, also the multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: stands for RAID I/O Steering, a type of RAID technology from Intel. RAIDIOS is a specification used to enable an embedded I/O controller, embedded on the motherboard, to be used as just an I/O controller or to be the I/O component of a hardware RAID subsystem. The RAIDIOS circuit allows an I/O Processor (either embedded on the motherboard or on an add-in card) to configure the I/O controller and service the I/O controller's interrupts. The I/O controller and the I/O Processor together are two of the primary components of a hardware RAID subsystem.

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data, is often used to refer to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SATA (Serial ATA): is an evolutionary replacement for the Parallel ATA physical storage interface. Serial ATA is a drop-in solution in that it is compatible with today's software and operating systems. It will provide for systems which are easier to

design, with cables that are simpler to route and install, smaller cable connectors, and lower voltage requirements.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SIMM (Single In-line Memory Module): formally the most common form of RAM for motherboards. They must be installed in pairs, and do not have the carrying capacity or the speed of DIMM modules.

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SSI (Server System Infrastructure): an industry initiative intended to provide ready-to-use design specifications for common server hardware elements (chassis, power supplies, and racks) to promote and support server industry growth.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

Striping: see RAID

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

Technical Support

If a problem arises with your system, you should first turn to your dealer for direct support. Your system has most likely been configured or designed by them and they should have the best idea of what hardware and software your system contains. Hence, they should be of the most assistance for you. Furthermore, if you purchased your system from a dealer near you, take the system to them directly to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

If these options are not available for you then Tyan Computer Corporation can help. Besides designing innovative and quality products for over a decade, Tyan has continuously offered customers service beyond their expectations. Tyan's website (**www.tyan.com**) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest softare and operating system components to keep their systems running as powerful and productive as possible. Tyan also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, Tyan serves multiple market segments with the industry's most competitive services to support them.

"Tyan's tech support is some of the most impressive we've seen, with great response time and exceptional organization in general" - Anandtech.com

Please feel free to contact us directly for this service at **techsupport@tyan.com**

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN website for FAQ's, bulletins, driver updates, and
    other information: http://www.tyan.com
3. Contact your dealer for help BEFORE calling TYAN.
4. Check the TYAN user group:
alt.comp.periphs.mainboard.TYAN

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

NOTE: A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN will pay to have the board shipped back to you

Notice for the USA
Compliance Information Statement (Declaration of Conformity Procedure) DoC
FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

1) This device may not cause harmful interference, and
2) This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Plug the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer on an experienced radio/television technician for help.

Notice for Canada

This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux norms de Classe B d'interference radio tel que specifie par le Ministere Canadien des Communications dans les reglements d'ineteference radio.)

C E   Notice for Europe (CE Mark)
        This product is in conformity with the Council Directive
        89/336/EEC, 92/31/EEC (EMC).

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

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